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**Datasheet for the decision
of 10 November 2010**

Case Number: T 1787/08 - 3.4.01

Application Number: 05713722.6

Publication Number: 1728297

IPC: H01Q 1/22

Language of the proceedings: EN

Title of invention:

Radio frequency identification tags with compensating elements

Applicant:

3M Innovative Properties Company

Opponent:

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Headword:

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Relevant legal provisions:

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Relevant legal provisions (EPC 1973):

EPC Art. 84

Keyword:

"Clarity (no; all requests)"

Decisions cited:

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Catchword:

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Case Number: T 1787/08 - 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 10 November 2010

Appellant: 3M Innovative Properties Company
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 5 March 2008
refusing European application No. 05713722.6
pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: B. Schachenmann
Members: H. Wolfrum
P. Fontenay

Summary of Facts and Submissions

- I. European patent application 05 713 722.6 (publication No. 1 728 297) was refused by a decision of the examining division dispatched on 5 March 2008, on the grounds of lack of clarity (Article 84 EPC 1973) and lack of novelty (Articles 52(1) and 54(1) and (2) EPC 1973) of the claims of the sole request then on file.
- II. The applicant lodged an appeal against the decision and paid the prescribed fee on 7 May 2008. On 8 July 2008 a statement of grounds of appeal was filed together with new sets of claims according to a main request and three auxiliary requests.
- III. On 14 July 2010 the appellant was summoned to oral proceedings to take place on 10 November 2010.
- In a communication annexed to the summons the board pointed *inter alia* to problems of clarity of the claims of all requests on file.
- IV. The appellant did not respond to the board's communication but informed the board by a letter of 8 October 2010 that it would not attend the oral proceedings.
- V. Oral proceedings were held on 10 November 2010 in the absence of the appellant.
- VI. The appellant has requested in writing that the decision under appeal be set aside and a patent be granted on the basis of a set of claims 1 to 5 according to a main request or, alternatively, on the

basis of sets of claims 1 to 5 according to auxiliary requests I and II or of a set of claims 1 to 4 according to auxiliary request III, all filed on 8 July 2008 with the statement setting out the grounds of appeal.

VII. Claim 1 of the **main request** reads as follows:

"1. A radio frequency identification (RFID) tag, comprising:
an inductive loop antenna (24); and
a compensating element (30) comprising a closed loop of conductive material sized and positioned on the RFID tag within ten inductive loop antenna line widths of at least one loop of the inductive loop antenna for electromagnetic coupling to the inductive loop antenna (24) to maintain an operating frequency of the inductive loop antenna at or near an operating frequency of an RFID system (10) in the presence of other RFID tags."

Claims 2 to 5 are dependent on claim 1.

Claim 1 of the **auxiliary request I** additionally qualifies the RFID tag and the RFID system as a "high frequency (HF)" tag or system, respectively, and replaces the term "to maintain" by "to center".

Claims 2 to 5 are dependent on claim 1.

Claim 1 of auxiliary request II reads:

"1. A high frequency (HF) radio frequency identification (RFID) tag, comprising:

an inductive loop antenna (24); and
a compensating element (30) comprising a closed loop of conductive material sized and positioned on the RFID tag within ten inductive loop antenna line widths of at least one loop of the inductive loop antenna for electromagnetic coupling to the inductive loop antenna (24) such that an operating frequency of the inductive loop antenna remains within an operating frequency range of approximately 13.56 MHz \pm 1 MHz in the presence of other HF RFID tags."

Claims 2 to 5 are dependent on claim 1.

Claim 1 of auxiliary request III reads:

"1. A high frequency (HF) radio frequency identification (RFID) tag, comprising:

an inductive loop antenna (24) configured to couple with an RFID reader of an RFID system (10) by near-field magnetic induction; and

a compensating element (30) comprising a closed loop of conductive material sized and positioned on the RFID tag within ten inductive loop antenna line widths of at least one loop of the inductive loop antenna for electromagnetic coupling to the inductive loop antenna (24) such that a primary current induced in the inductive loop antenna (24) by the near-field magnetic induction coupling with the RFID reader induces a counter-circulating parasitic current in the compensating element (30) so as to lower the effective inductance of the RFID tag to substantially center an operating frequency of the inductive loop antenna near an operating frequency of an HF RFID system (10) in the presence of other HF RFID tags by reducing tag-to-tag

coupling as a result of the lowered effective inductance of the RFID tag."

Claims 2 to 4 are dependent on claim 1.

Reasons for the Decision

1. In the light of the entry into force of the EPC 2000, reference is made to Article 7(1), 2nd sentence of the Revision Act of 29 November 2000 ("Act revising the Convention on the Grant of European Patents (European Patent Convention) of 5 October 1973, last revised on 17 December 1991") and the transitional provisions for the amended and new provisions of the EPC (Decision of the Administrative Council of 28 June 2001), from which it may be derived which Articles of the EPC 1973 are still applicable and which Articles of the EPC 2000 shall apply.
2. The appeal complies with the requirements of Articles 106 to 108 and Rule 99 EPC and is, therefore, admissible.
3. Notwithstanding the appellant's argumentation with respect to the technical effects associated with the claimed subject-matter, the board does not find fault with the examining division's assessment of lack of novelty for the RFID tag according to claim 1 of the main request. Nevertheless, a detailed discussion of this matter is not considered to be necessary in view of the fact that first and foremost the issue of clarity (Article 84 EPC 1973) has to be dealt with.

4. In its aforementioned communication the board had expressed its preliminary view that the claims of all the requests on file suffered in various respects from a lack of clarity. Since the appellant neither replied to these objections nor filed any amendments to the claim definitions, the board has no reason to change its preliminary opinion.

4.1 In claim 1 of the main request the feature "to maintain an operating frequency of the inductive loop antenna at or near an operating frequency of an RFID system (10) in the presence of other RFID tags", by which it is intended to define the size and position of a compensating element on the RFID tag, is unclear for several reasons.

Firstly, the feature merely defines a result to be achieved, without giving any indication as to which structural measures would have to be taken in addition to the expressly claimed positioning of the compensating element within ten inductive loop antenna line widths of at least one loop of the antenna. In particular, in view of the lack of a well-established relationship between the size of the compensating element and the operating frequency of the associated loop antenna, it is not clear in which manner the desired result could guide the skilled person in the task of designing a compensating element having the correct size. As a matter of fact, the claimed result turns out to be nothing else than the statement of the problem to be solved, as it can be deduced for instance from paragraphs [0006] and [0037] of the application description as published under the PCT.

Secondly, it remains obscure what exactly is meant by the indication "*at or near an operating frequency of the RFID system*".

In paragraph [0061] of the description it is stated that a compensated RFID tag "*can be tuned so that its resonant frequency f_{TAG} is centered near the operating frequency f_0 of RFID system 10*". However, according to the examples discussed by reference to Figures 15A, 15B and 16 and their corresponding description, a significant shift in the frequency response of the tag (to a shifted frequency of 16 MHz (Figures 15B and 16) or even more than 18 MHz (Figure 15A) with respect to an operating frequency of the RFID system at 13.56 MHz) may take place due to the presence of the compensating element. For the embodiment of Figure 17, where the compensating element is formed by shorted loops of the RFID antenna, the corresponding frequency shift (" f_0 (+MHz)") is even more pronounced in that it exceeds 8 MHz and may reach 30 MHz.

On the other hand, a comparison with curves 52, 54 and 56 of Figure 14 reveals that the presence of further tags reduces the frequency response of the RFID tag by less than 1 MHz. Thus, it is apparent from the application description that the provision of a compensating element according to the specific examples discussed in Figures 15A, 15B, 16 and 17 may cause a shift in the frequency response of the RFID tag from the operating frequency of the RFID system to an extent that would only be partly compensated by the presence of further tags so that the tag's shifted frequency response (in the absence as well as in the presence of further RFID tags) could lie well outside the frequency

response of the RFID system (cf curve 40 in Figure 14). Apparently, this problem would occur in particular in cases in which the compensating element is added onto pre-existing RFID tags (see the embodiment of Figure 10 and paragraphs [0056] and [0073] of the description).

A further aspect regarding lack of clarity concerns the claimed position of the compensating element, in that it is not clear what the requirement in present claim 1 "*within ten inductive loop antenna line widths of at least one loop of the inductive loop antenna*" would actually mean in case of an arrangement as illustrated for instance in Figure 7 of the application, which shows a squared-shaped compensating element that overlaps square-shaped antenna loops with the diagonals of two square shapes being inclined by an angle of 45°, or as sketched in Figure 18, which shows a compensating element and an antenna that are arranged at different levels of a layered structure and separated by an additional substrate.

- 4.2 Notwithstanding the amendments made in the auxiliary requests on file, the clarity objections given above for claim 1 of the main request apply with equal force to claim 1 of each of auxiliary requests I to III.

5. For the above reasons, none of the appellant's requests on file complies with the requirement of Article 84 EPC 1973.

In conclusion, the appellant's requests are not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

R. Schumacher

B. Schachenmann